

East Stroudsburg University Upward Bound

Geometry Summer 2009

08:00 – 9:20 AM Monday - Thursday 6/22 – 7/30 Stroud 315

Instructor: Frederick R. Chandler
 Email: rickchandler0@hotmail.com
 Phone: 570-620-9221 x 815

Instructional Resources: Geometry Text provided (TBD), Calculator, Pencil, and Eraser

Topics covered: Basic Geometry & Graphing
 Proofs
 Measurement of Segments and Angles
 Collinearity, Betweenness, & Assumptions
 Angles
 Similarity & Congruence

Learning Outcomes: At the conclusion of this course a student will:

Outcome 1: The student will identify and apply basic geometric concepts to represent and solve problems, and use either inductive or deductive reasoning to test conjectures and prove specific facts.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none"> Identify point, line, and plane and draw representation of them in both two and three dimensions. Name angles and find their measures. Use symbols for lines, segments, and rays and find the length and midpoint of a segment. State the hypothesis, conclusion, converse inverse, contrapositive, and biconditional of a conditional statement. Identify postulates, definitions, and write basic theorems two-column deductive proofs. Identify the special angles related to parallel lines and calculate their measures. Prove two lines parallel. Name polygons and find the measure of both interior and exterior angles. 	<ul style="list-style-type: none"> Draw and label a variety of geometric pictures. Use the definitions, theorem and postulates to find the measures of missing angles, lengths of segments, or coordinates of a midpoint. Write the hypothesis, conclusion, converse inverse, contrapositive, and biconditional of conditional statements and assess the validity of each statement through cooperative group work and individual reinforcement. Write and present two column deductive proofs to the class either using the board or overhead projector. Discuss common reoccurring proofs and compile a sampling of such proofs for use with more involved proofs. Through practice worksheets and a variety of group activities determine the measures of angles related to parallel lines and polygons. 	<ul style="list-style-type: none"> Teacher made test and quizzes. Worksheets and study guides. Cooperative learning group work. Homework Class participation Teacher observation

	<ul style="list-style-type: none"> • Student generated problems used to reinforce various types of angle problems and proofs. • Discuss alternate forms of proof, such as: constructions, visual manipulation of figures to justify a given fact, and indirect proofs. • Student created index cards of basic facts. • Students work in pairs to review content. • Bingo used as a review game for tests or quizzes. • Utilize reteaching activities and worksheets. • Create 3-D model to represent the basic geometric shapes. • SAT application problems. • Group work to review concepts • Schedule remediation time for with any students who need extra help. 	
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Outcome 2: The student will identify and use basic properties of a triangle to solve numeric problems and write triangular congruence proofs.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none"> Identify the corresponding parts of congruent figures, and use to solve numeric problems. Prove two triangles congruent by: SAS, ASA, SSS, AAS, and HL. Apply C.P.C.T.C. to prove corresponding angles or sides congruent. Identify the median, altitude, and angle bisector of a triangle and solve related problems and proofs. Prove congruencies in the cases of overlapping triangles and multiple triangular congruence proofs. 	<ul style="list-style-type: none"> Student will list the corresponding parts for congruent figures and write a proper congruence relationship. Use group and individual work; develop an understanding of and ability to do basic triangular congruence proofs. A key step approach to each proof will be developed that will guide each student through the major steps needed for each proof. Demonstrate correct proofs on the board and provide students with a variety of ways to think through and develop their own methods to do basic geometric proofs. Define the median, altitude, and angle bisector of a triangle and talk about the properties of their respective points of concurrence. Tutoring (teacher or peer) Utilize reteaching activities and worksheets. Teacher provided proofs to challenge the skills of the students. Point of concurrence concepts and their verification by basic geometric constructions. 	<ul style="list-style-type: none"> Teacher made test and quizzes. Worksheets and study guides. Cooperative learning group work. Homework Class participation Teacher observation

Outcome 3: The student will identify and use the basic properties of a parallelogram and special quadrilaterals in numeric problems and proofs.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none">• State and apply the theorems and properties of a parallelogram.• State and apply the theorems used to prove a quadrilateral is a parallelogram.• Identify and use the special properties of a rectangle, rhombus, kite, trapezoid, and square.	<ul style="list-style-type: none">• Identify each quadrilateral and its properties.• Demonstrate proofs using the properties of a parallelogram, and proofs that a quadrilateral is a parallelogram on the board and overhead projector.• Cooperative group work.• Tutoring (teacher or peer)• Utilize reteaching activities and worksheets.• Student created index cards of each special quadrilateral and its properties.• Teacher provided proofs to challenge the skills of the students.	<ul style="list-style-type: none">• Teacher made test and quizzes.• Worksheets and study guides.• Cooperative learning group work.• Homework• Class participation• Teacher observation

Outcome 4: The student will identify and use ratios and properties of proportions to prove polygons similar and solve numeric problems.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none"> • Identify a ratio and proportion. • Solve for the unknown term in a given proportion. • Rewrite a proportion as an equivalent equation using the properties of proportions. • Identify two polygons by definition as similar and determine the scale factor. • Prove two triangles similar by AA, SAS, or SSS theorems for similarity. • Solve numeric problems using the definition of similarity, properties of proportions, or angle-bisector and side-splitter theorems. 	<ul style="list-style-type: none"> • Demonstrate how to set up and solve various types of proportion problems. • Identify the parts of a proportion and utilize their properties to solve problems in reinforcement worksheets. • Demonstrate the set up and solution to problems involving similarity and its related theorems. • Cooperative group work. • Tutoring (teacher or peer) • Utilize reteaching activities and worksheets. • Student created index cards illustrating the properties of proportions • Use of SAT problems • Use of the properties of proportions in similar triangle proofs. • Algebraic problems related to ratio and proportion. 	<ul style="list-style-type: none"> • Teacher made test and quizzes. • Worksheets and study guides. • Cooperative learning group work. • Homework • Class participation • Teacher observation

Outcome 5: The student will identify and use the Pythagorean Theorem and special right triangle relationships to solve numeric problems.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none"> • Simplify radical expressions and solve quadratic equations. • State and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle. • Determine the length of a side of a right triangle using the Pythagorean Theorem or Pythagorean triples. • Solve for the missing sides using the 30-60-90 and 45-45-90 special triangle relationships. • Classify a triangle as acute, obtuse or right using the converse of the Pythagorean Theorem. 	<ul style="list-style-type: none"> • Prove the Pythagorean Theorem. • Demonstrate through board work how to solve for the missing side of a right triangle using the Pythagorean Theorem or when appropriate, the Pythagorean Triples. • Provide students with visual as well as written rules for the 30-60-90 and 45-45-90 special triangle relationships and demonstrate how to apply these rules. • Complete teacher designed worksheets to review the special right triangles. • Utilize group activities to reinforce student understanding of the special right triangles. • Cooperative group work • Tutoring (teacher or peer) • Utilize reteaching activities and worksheets. • Flashcards • Use of related SAT problems. • Solve right triangle problems by correct selection and use of the sine, cosine, and tangent functions. 	<ul style="list-style-type: none"> • Teacher made test and quizzes. • Worksheets and study guides. • Cooperative learning group work. • Homework • Class participation • Teacher observation

Outcome 6: The student will identify and use the basic parts of a circle and properties involving arcs, angles, and segments in numeric problems and proofs.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none"> • Identify all geometric parts related to a circle. • State and apply properties involving the special angles of a circle and their related arcs. • Determine the length of a radius, diameter, tangent, and secant segments of a circle. • Determine the circumference of a circle and/or length. • Find the area of a circle, sector, segment of a circle, and related composite areas. 	<ul style="list-style-type: none"> • Prove the theorems and demonstrate the solutions to problems involving the angles and arcs of a circle. • Use collaborative group to review problems related to the circle. • Create a study guide of formulas to calculate the circumference, arc length, area, segment area, and composite areas. • Cooperative group work. • Tutoring (teacher or peer) • Utilize reteaching activities and worksheets. • Flashcards • Use of SAT related problems. 	<ul style="list-style-type: none"> • Teacher made test and quizzes. • Worksheets and study guides. • Cooperative learning group work. • Homework • Class participation • Teacher observation

Outcome 7: The student will identify and use the basic concepts and formulas for area and volume of two and three-dimensional geometric shapes.

Content Outcomes	Instructional Activities / Strategies	Evaluation / Assessment
<ul style="list-style-type: none"> • Calculate the area for the following shapes: rectangle, parallelogram, trapezoid, rhombus, kite, triangle, circle, and composite shapes. • Determine the areas of shapes formed by a combination of known shapes through addition or subtraction of areas. • Identify the apothem, radius, and central angle of a regular polygon. • Calculate the area for a regular polygon and the dimensions of its respective parts. • Label the various parts of a prism, pyramid, cylinder, cone, and sphere. • Calculate the lateral area, total area, and volume for right prisms, pyramids, cylinders, and cones. • Calculate the surface area and volume of a sphere. 	<ul style="list-style-type: none"> • Develop a formula list that will assist the student in identification and application of the appropriate formula to solve an area calculation problem. • Complete teacher created review packets to reinforce area calculation skills. • Utilize 3-D models of the prism, pyramid, cylinder, cone, and sphere to help visualize and identify the parts of these shapes. • Teacher directed practice on drawing these 3-D shapes to assist in problem solving. • Complete a variety of application problems to practice their skills with the volume and surface area formulas. • Cooperative group work. • Tutoring (teacher or peer) • Utilize reteaching activities and worksheets. • Use of actual models or constructed areas for the visual learner. • Flashcards • Use of SAT related problems. • Calculate the area or volume of more complex composite two and three-dimensional shapes. 	<ul style="list-style-type: none"> • Teacher made test and quizzes. • Worksheets and study guides. • Cooperative learning group work. • Homework • Class participation • Teacher observation

Class attendance: Refer to student handbook. This is an 80 minute class. There are no breaks. Please be sure all necessary eating, phone calls, and bathroom activities are taken care of prior to class time. A beverage during class is acceptable (coffee, water, etc). This 80 minute class time is ours together only.

Inclement weather: Refer to student handbook

Methods of Instruction and Evaluation:

A combination of methods (including lecture, discussion, discovery techniques and problem-solving) is used in this course. Every effort is made to involve the student in the doing of mathematics, since it is only in the doing of mathematics that one can learn something of the nature and thought processes of mathematics. The student will be evaluated on the basis of performance on weekly tests, homework, and class participation.

Six weekly tests at 100pts each	600
Homework & class participation	100
Total	700

A = 630 – 700 pts B = 560 – 629 pts C = 490 – 559 pts D = 420 – 489 pts

NB: This syllabus is subject to change